Two options for approach to Budd Inlet* and Puget Sound DO TMDLs
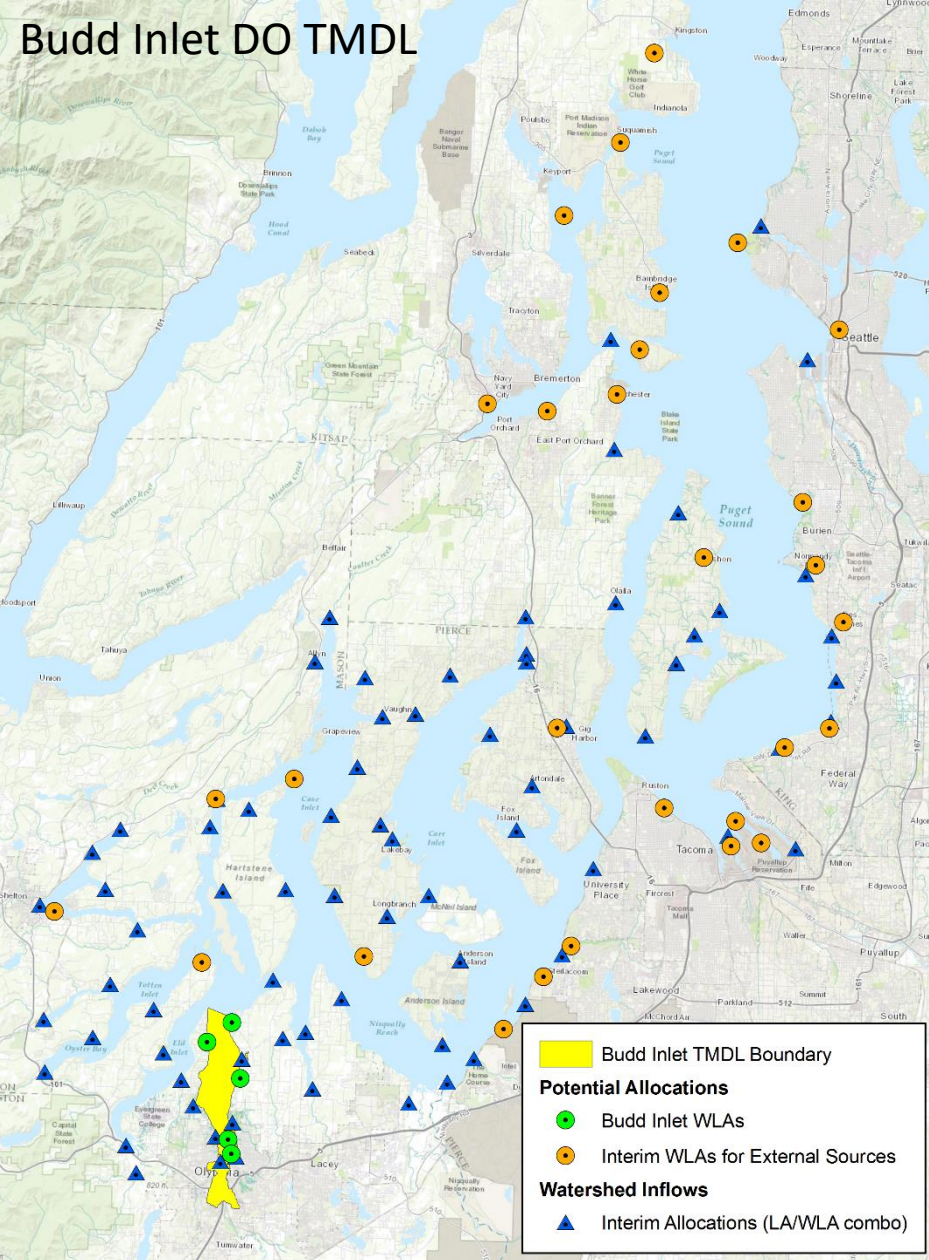
1. Develop separate Budd Inlet and Puget Sound DO TMDLs
   a) Budd Inlet sets interim WLAs and watershed inflow targets for external sources; Puget Sound TMDL revises WLAs
   b) Budd Inlet TMDL sets loading capacity (akin to a bubble allocation) for the sum of external (to Budd Inlet) sources; Puget Sound TMDL figures out how to allocate the bubble to external sources
2. Combine Budd Inlet TMDL into Puget Sound DO TMDL

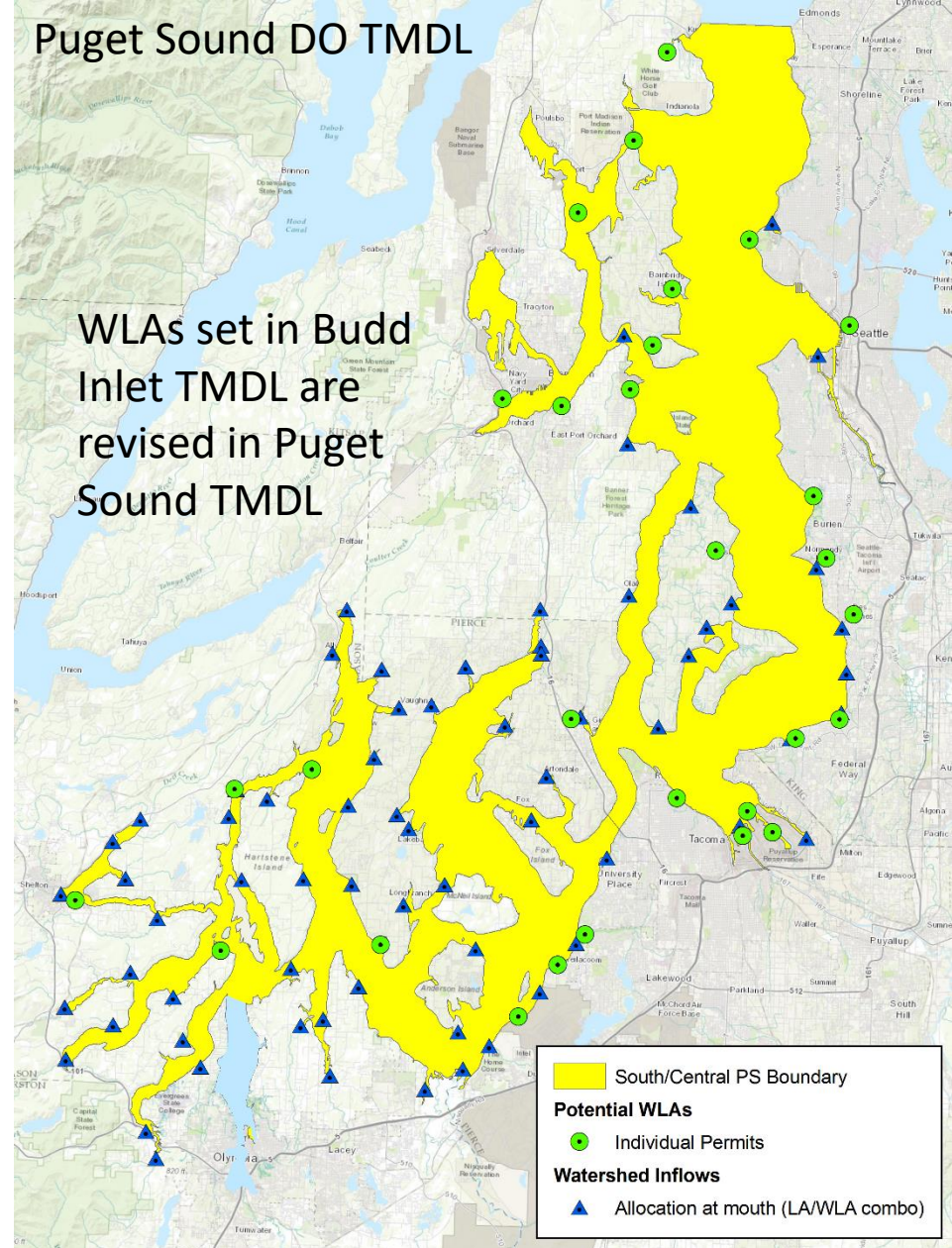*Budd Inlet DO TMDL includes both Budd Inlet and Capitol Lake

Budd Inlet DO TMDL

Legend:
- Budd Inlet TMDL Boundary
- **Potential Allocations**
  - Budd Inlet WLAs
  - Interim WLAs for External Sources
- **Watershed Inflows**
  - Interim Allocations (LA/WLA combo)

Option 1a (current path):

- Budd Inlet TMDL sets interim targets for individual point sources and watershed inflows external to Budd Inlet.
- Puget Sound TMDL keeps Budd Inlet WLAs, revises interim targets to actual WLAs and watershed inflow targets (WLA/LA Combo)
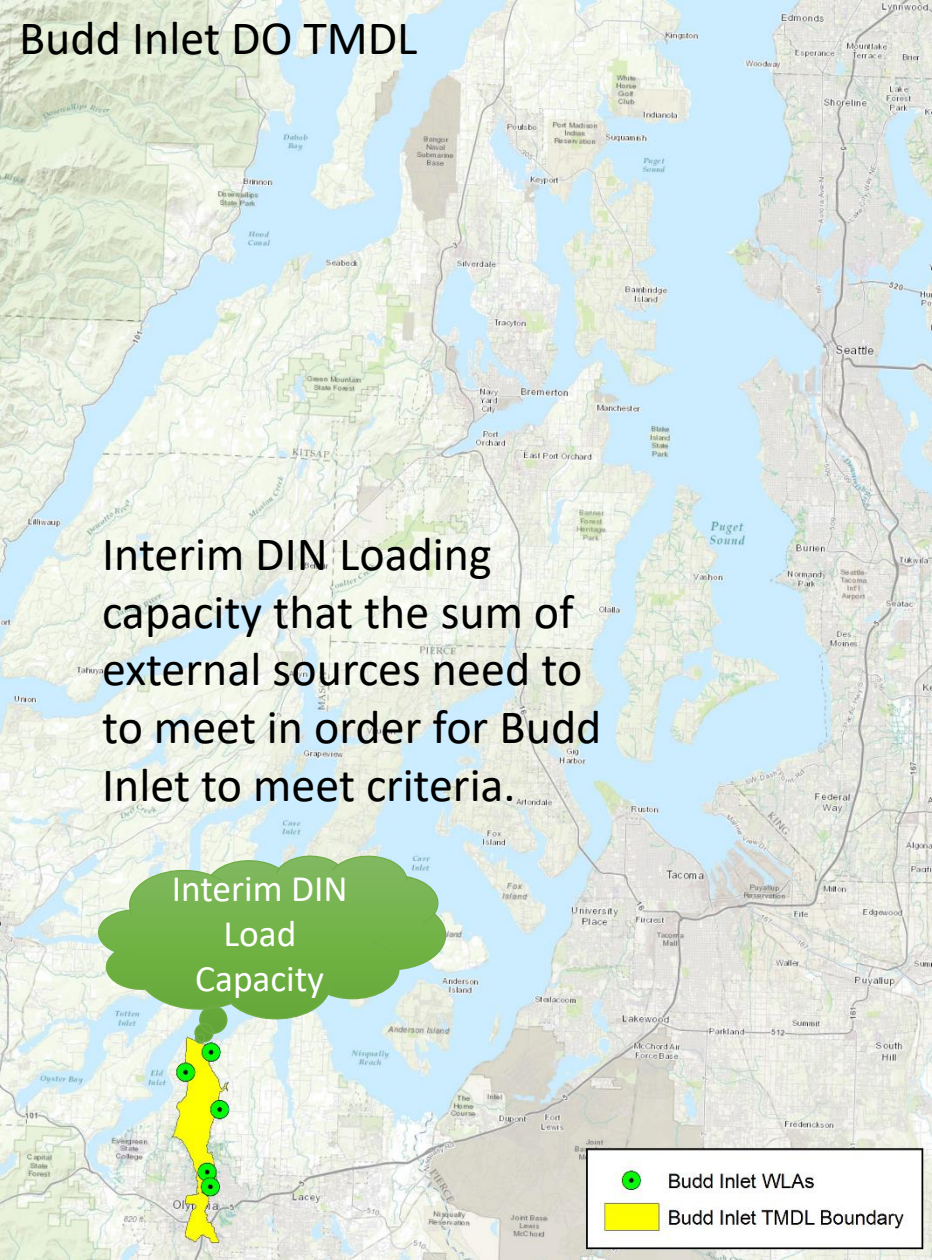
Pros/Cons:

- Most time consuming due to loss of modeling efficiency having to model and allocate external sources twice.
- Puts Puget Sound TMDL on fast track to be closer to Budd Inlet schedule
- Would most likely have to go to all permittees (and Budd Inlet sources) twice; first time for Budd Inlet TMDL and second time for revised WLAs under the Puget Sound TMDL.

Risks:

- Having to go to permittees twice with proposed WLAs will be confusing and frustrating for them and less likely for us to get what we want.
- If Budd Inlet TMDL approval is held up, then it would have a cascading affect potentially holding up the Puget Sound TMDL schedule.

Puget Sound DO TMDL

WLAs set in Budd Inlet TMDL are revised in Puget Sound TMDL

Legend:
- South/Central PS Boundary
- **Potential WLAs**
  - Individual Permits
- **Watershed Inflows**
  - Allocation at mouth (LA/WLA combo)

Budd Inlet DO TMDL

Interim DIN Loading capacity that the sum of external sources need to to meet in order for Budd Inlet to meet criteria.

Interim DIN Load Capacity

Legend:
- ● Budd Inlet WLAs
- ▨ Budd Inlet TMDL Boundary

Option 1b:

- Budd Inlet DO TMDL sets an interim load capacity that is the sum of all external source impacts needed to be reduced to meet criteria in Budd Inlet.
- Subsequent Puget Sound DO TMDL sets allocations for all other point sources and watershed inflows while ensuring that DIN entering Budd Inlet does not exceed the bubble.
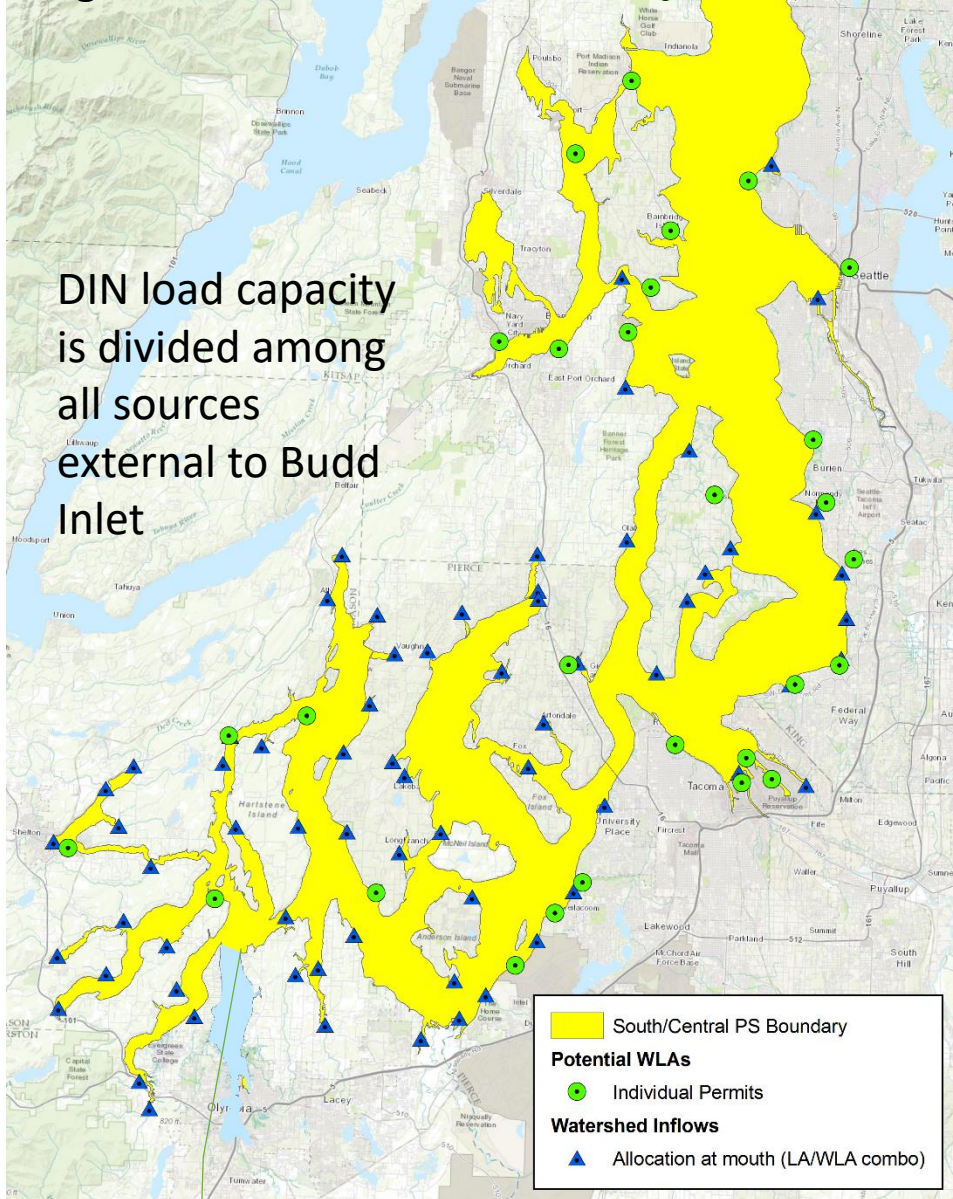
Pros/Cons:

- Detail of external source allocations can be worked out in Puget Sound DO TMDL instead of in Budd Inlet TMDL.
- Allows Budd Inlet DO TMDL to move forward under it's own schedule.
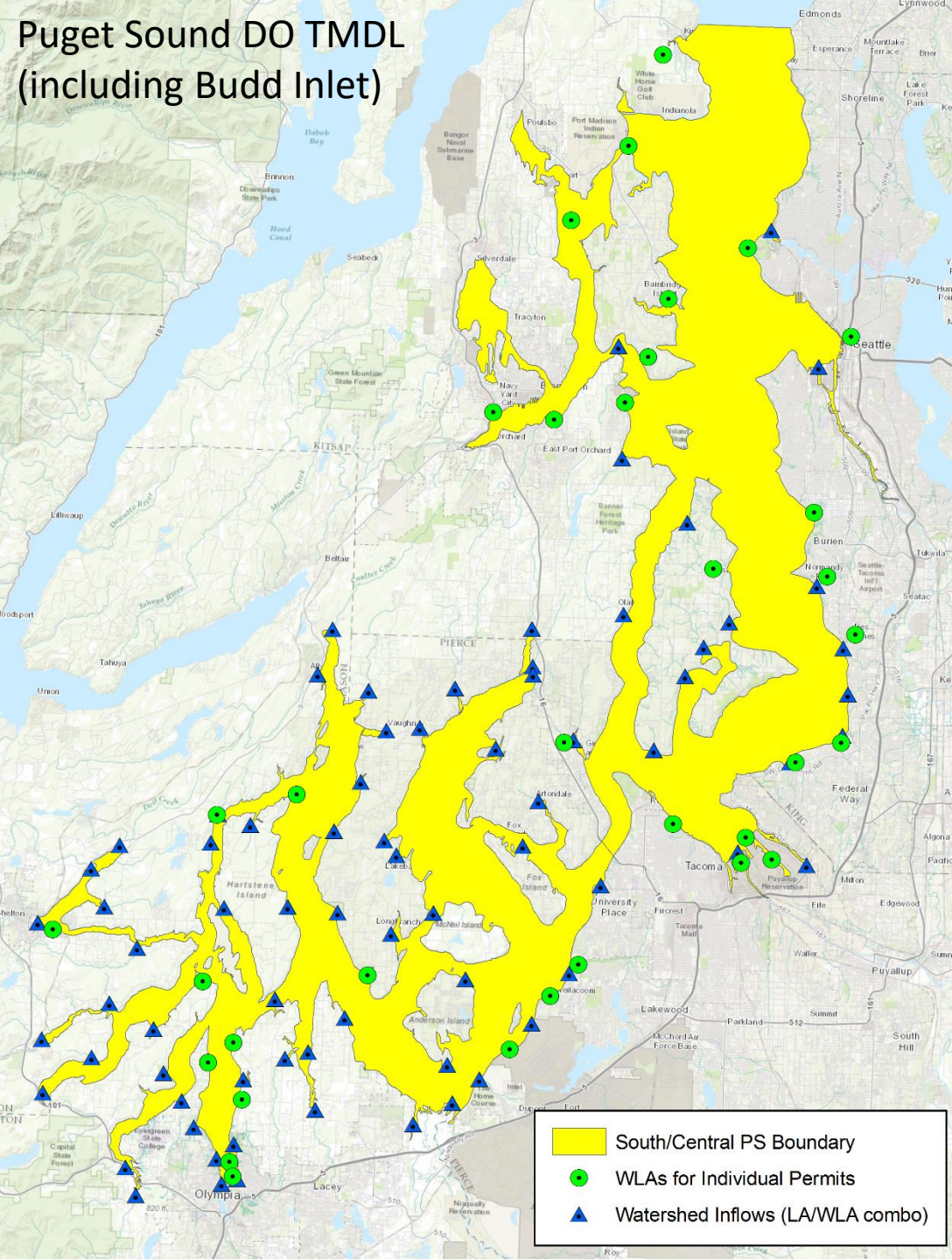- Less modeling is needed than Option 1a.

Risks:

- Lowers risk of postponing Budd Inlet TMDL because of time it will save by not allocating reductions to external sources
- Need EPA to provide assurance this approach for Budd Inlet TMDL is approvable.

Puget Sound DO TMDL

DIN load capacity is divided among all sources external to Budd Inlet

Legend:
- ▨ South/Central PS Boundary
- **Potential WLAs**
- ● Individual Permits
- **Watershed Inflows**
- ▲ Allocation at mouth (LA/WLA combo)

Sum of allocations = LC going into Budd Inlet

Puget Sound DO TMDL
(including Budd Inlet)

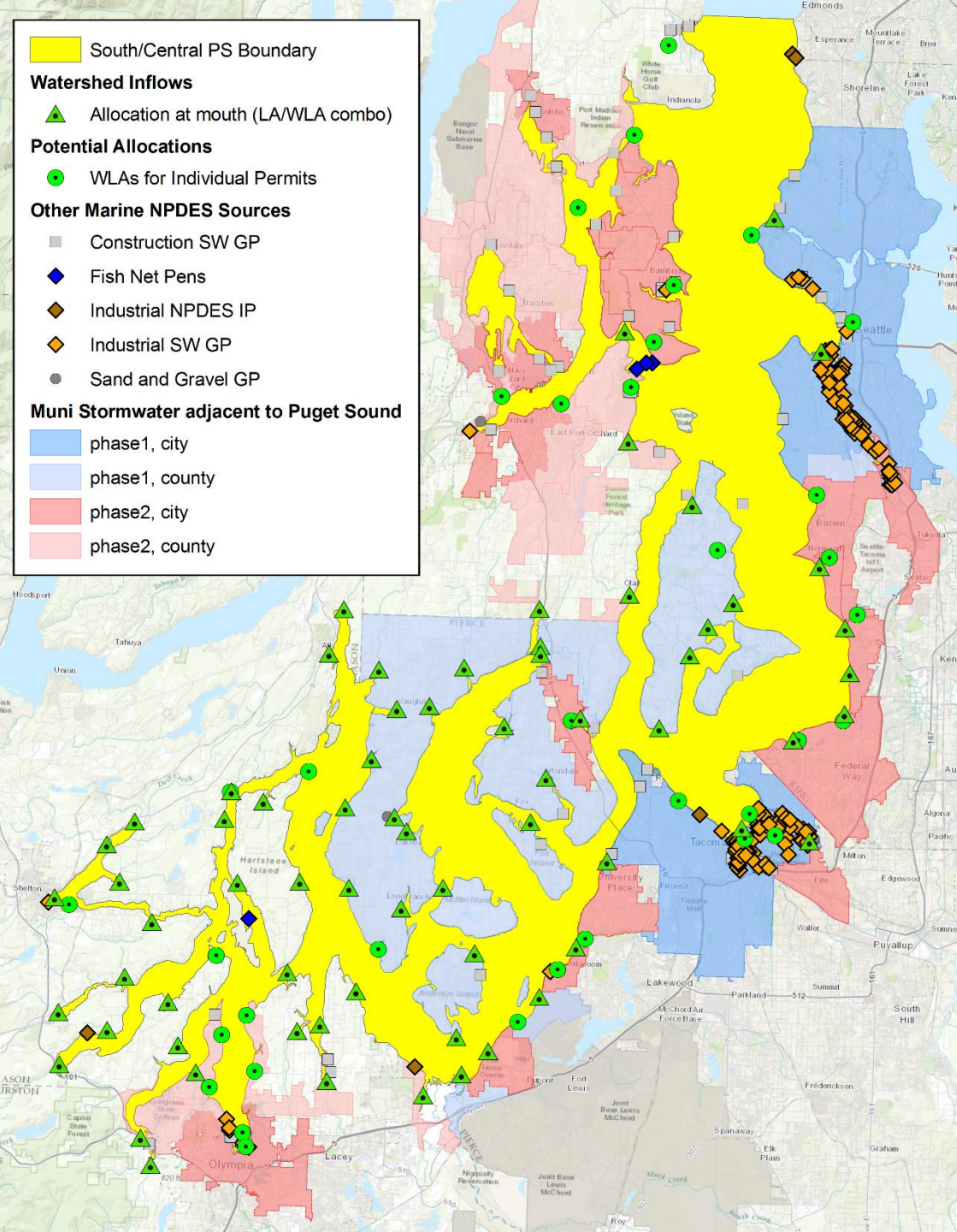|	
🟡	South/Central PS Boundary
🟢	WLAs for Individual Permits
🔺	Watershed Inflows (LA/WLA combo)

Option 2:

- Budd Inlet DO TMDL effort merged into Puget Sound DO TMDL.
- Puget Sound DO TMDL sets all WLAs and watershed inflow targets (WLA/LA combos)
- SWRO continues to interact with WA DES on lake/estuary management options

Pros/Cons:
- This would be the most time/work efficient approach for the modeling because we are not asking EAP to do separate modeling efforts.
- Will put Budd Inlet TMDL on track with the Puget Sound TMDL schedule.
- Would be another significant change to the Budd Inlet DO TMDL after separating from the Deschutes et al TMDL. Messaging to stakeholders has been that we are keeping the projects separate.

Risks:
- We lose some of the strategic advantage of publishing a Budd Inlet TMDL before DES makes the decision on the lake. But, if we can complete a Puget Sound TMDL before DES makes a decision then it won't affect SWRO's strategy.
- Lowers risk of reallocating WLAs and watershed inflows by going through the process once.

Legend (map):

- South/Central PS Boundary
- **Watershed Inflows**
  - Allocation at mouth (LA/WLA combo)
- **Potential Allocations**
  - WLAs for Individual Permits
- **Other Marine NPDES Sources**
  - Construction SW GP
  - Fish Net Pens
  - Industrial NPDES IP
  - Industrial SW GP
  - Sand and Gravel GP
- **Muni Stormwater adjacent to Puget Sound**
  - phase1, city
  - phase1, county
  - phase2, city
  - phase2, county

Summary of potential wasteload allocations. General permits are not model inputs and are probably not significant sources but may need WLA too (TBD). This is a draft list and will be further refined. General Permits are not included in the pathway option maps for clarity, but could be part of the Puget Sound TMDL. Need to ask EPA if we must include GP dischargers to Puget Sound?

Number of Watershed Inflows (LA/WLA Combo)	69

NPDES Permits	
Permit Type	**Count of Permits**
Add to PS Model	**6**
Fish Net Pens	4
Industrial NPDES IP	1
Municipal NPDES IP	1
Budd Inlet Sources	**6**
Construction SW GP	1
Industrial NPDES IP	1
Municipal NPDES IP	4
Current PS Model Sources	**29**
Industrial NPDES IP	1
Municipal NPDES IP	28
Not in Model but may need allocation	**286**
Construction SW GP	85
Industrial NPDES IP	20
Industrial SW GP	168
Municipal NPDES IP	1
Sand and Gravel GP	11
Water Treatment Plant GP	1
Grand Total	**327**

Municipal Stormwater Permits	
Phase I City	2
Seattle	
Tacoma	
Phase I County	2
King	
Pierce	
Phase II City	15
Bainbridge Island	
Bremerton	
Burien	
Des Moines	
DuPont	
Federal Way	
Fife	
Gig Harbor	
Normandy Park	
Olympia	
Port Orchard	
Poulsbo	
Steilacoom	
Tukwila	
University Place	
Phase II County	2
Kitsap	
Thurston	
Grand Total	21

Budd Inlet DO Model Extent

Budd Inlet model grid cells

Calibration Year: 1997 (water quality, emission inventory and circulation);
Separate model for Capitol Lake developed, calibrated with 2004 data, validated with 2001 data and integrated into 1997 Budd Inlet simulation.

Current Modeling Status: (see Budd Inlet DO TMDL Project Plan for model scenarios)

Climate Change is not included as attribute of future condition
Modeling is performed on EAP-ECY servers, depends on Salish Sea model runs for sediment diagenesis scalars.
- Sediment diagenesis added via scalars from Salish Sea model (with added sediment diagenesis module)
- Current Condition-Salish Sea model (2006) model run completed
- Natural Conditions model run completed
- Pollutant Reduction Scenarios (to begin to occur in late 2017, per NEP grant)

Next Modeling Steps for EAP given the current path (Option 1a):
- Evaluate options and make decision on vertically aggregating model cells needed for translating model outputs into violations of criteria
- Compare updated emission inventory (2014) with 1997 inventory by 11/30/2016
- Re-run preferred scenario with updated emission inventory by 1/30/2017, if major changes to emission inventory are not needed.
- Conduct further scenario runs as needed

Schedule Issues
- The following NEP grant requirements must be completed by June 30, 2018: Salish Sea model is improved and peer reviewed—providing a capability to conduct analysis of impact of individual sources in portions of the domain, report on climate change scenarios completed.

Outstanding issues that affect project schedule:
- Natural conditions?
- Decision on how to allocate wasteloads to external sources to Budd Inlet
- Decisions on level of updates that are needed for 2014 emission inventory
- Model Runs to identify significant point sources (turning each facility on/off)
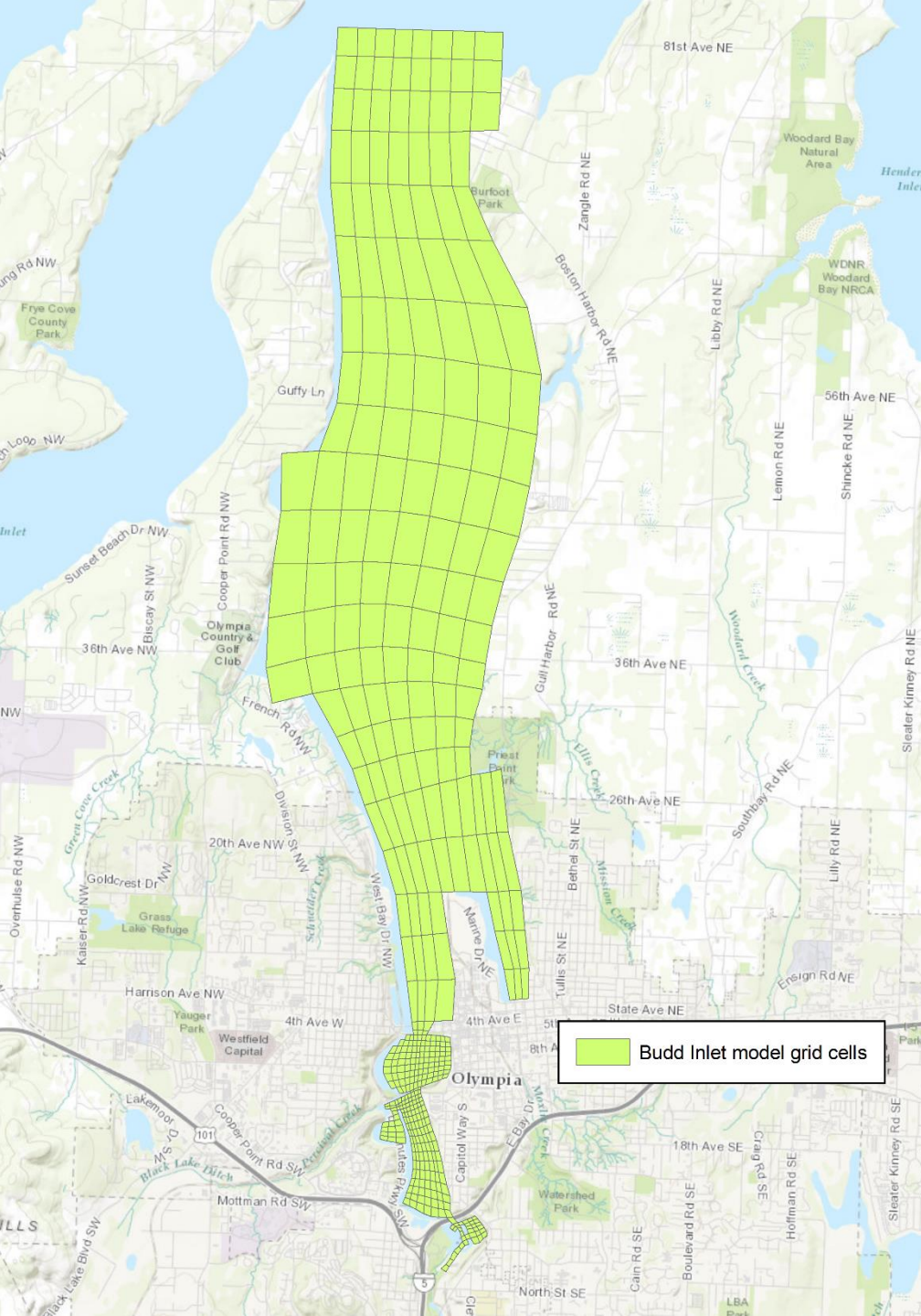
Salish Sea DO Model Extent

Calibration Year: 2006
Validation Year: 2014
Climate change will be part of future condition scenario
Modeling is performed on PNNL computer cluster which requires time and money
The goal is for the Salish Sea model to replace SPSDO model by using higher resolution grid cell sizes
Puget Sound pollutant source reduction scenarios need to be developed regardless of the project pathway chosen but the timing and extent of that changes depending on the chosen option

Current Modeling Status:
- Sediment diagenesis model is integrated with Salish Sea circulation and wq model

Next Modeling Steps for EAP given the current path (Option 1a)
- Evaluate options and make decision on vertically aggregating model cells needed for translating model outputs into violations of criteria
- Run scenarios for: current condition, natural conditions, and future condition with climate change effects but no advanced nutrient removal treatment for WWTPs

Schedule Issues
- The following NEP grant requirements must be completed by June 30, 2018: Salish Sea model is improved and peer reviewed—providing a capability to conduct analysis of impact of individual sources in portions of the domain, report on climate change scenarios completed.
- Developing pollutant reduction scenarios needs to happen in parallel with modeling of current/natural/future condition runs so there is little to no gap between end of current/natural/future conditions modeling and pollutant reduction scenarios modeling

Outstanding issues that affect project schedule
- Natural conditions
- Model Runs to identify significant point sources (turning each facility on/off)
- With expansion to Salish Sea Model, should we consider other including other WWTPs north of current SPSDO Model domain?